TITLE OF THE INVENTION

MOBILE COMMUNICATION TERMINAL AND CONTROL UNIT

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is based upon and claims the

5 benefit of priority from the prior Japanese Patent

Application No. 2003-030510, filed February 7, 2003,

the entire contents of which are incorporated herein by

reference.

BACKGROUND OF THE INVENTION

10 1. Field of the Invention

The present invention relates to a mobile

communication terminal for use in a cellular mobile

communication network system.

2. Description of the Related Art

15 In a cellular mobile communication network system,

a plurality of base stations are provided in a service

area, and each base station forms a radio zone called a

cell. In each cell, the corresponding base station is

connected by radio to mobile communication terminals.

20 In this system, when a mobile communication terminal is

turned on, synchronization is established between the

terminal and the closest base station. After the

establishment of synchronization, the terminal shifts

to a standby state. In the standby state, an incoming

25 call is transmitted from the base station to the

terminal, or negotiation is performed for establishing

a communication link between the terminal and base

station if the terminal performs an operation for an outgoing call. When the communication link is established, the terminal shifts to a communication state.

5   In a cellular mobile communication network system, hand-off is performed when a mobile communication terminal moves from a cell to another cell. "Hand-off" means a process for changing, to another, the base station as a synchronization establishment destination.

10   In the standby state and communication state, a mobile communication terminal acquires, from the base station with which synchronization is established (hereinafter referred to as an "active base station"), a neighbor list message listing the base stations located near the

15   active base station. The mobile communication terminal searches for the neighboring base stations, using this message, and performs hand-off processing, if necessary.

For example, in a system employing a code division

20   multiple access (CDMA) method, in which a mobile communication terminal establishes synchronization with a base station using sliding correlation therebetween, each base station transmits a pilot signal diffused by a diffusion code. The diffusion code used to diffuse

25   the pilot signal is provided with an initial phase offset value, which varies between base stations. Each mobile communication terminal receives pilot

signals transmitted from peripheral base stations, using the offset values recited in the neighbor list message, thereby measuring the reception quality of the pilot signals. The measurement of reception quality is performed by, for example, detecting the signal/interference-wave ratio (SIR) or reception-signal level. Based on the measurement results, the mobile communication terminal selects a peripheral base station of the best reception quality, and uses this base station as a destination candidate with which synchronization is to be established.

On the other hand, if all the measured reception quality levels are lower than a reference value, the mobile communication terminal determines that there is no appropriate base station for a destination candidate. In other words, it is determined that all peripheral base stations are out of range. After that, the terminal searches the base stations over all phases of the diffusion code used to diffuse pilot signals, and selects the base station from which the best reception quality can be acquired. Searching over all phases of a diffusion code corresponds to initial resetting for selecting a base station upon the turn-on of the mobile communication terminal. Accordingly, this operation requires a lot of time and power consumption. If it is performed frequently, the battery life of the terminal is shortened.

For various reasons, "Out of Range" determination
is made. For example, the acquired neighbor list
may become an inappropriate one due to a change in
the positional relationship between the mobile
5   communication terminal and base stations.

FIG. 4 is a view useful in explaining such a case.
In the figure, assume that a mobile communication
terminal MS establishes synchronization with a base
station BS-A, and the neighbor list acquired from
10 the active base station BS-A lists a peripheral base
station BS-B. In this state, even if the terminal MS
moves to a second position, the communication state
does not change. However, if the terminal MS further
moves to a third position, the communication between
15 the terminal and base station BS-A is interrupted by
an obstacle 1. At this time, the terminal MS hands off
from the base station BS-A to the peripheral base
station BS-B listed in the neighbor list.

After that, if the terminal MS moves to a fourth
20 position, communication with the base station BS-B is
interrupted by an obstacle 2. The fourth position is
close to a base station BS-C. However, if the neighbor
list acquired from the base station BS-B does not list
the base station BS-C, and a pilot signal of sufficient
25 reception quality cannot be acquired from any other
peripheral base station listed in the neighbor list,
the terminal MS determines that it is out of the range

of the base stations listed in the neighbor list.
In this case, the mobile communication terminal MS must
perform the above-mentioned searching over all phases
of a diffusion code.

5   Since the transmission lines for mobile communica-
tion are very complex, it is difficult to prepare a
neighbor list that enables optimal hand-off processing
to be executed in all positions in its service area.
Therefore, it is a frequent practice to perform
10   searching over all phases of a diffusion code.

There are known techniques for reducing the power
consumption of a mobile communication terminal by
shortening the time required for base-station searching
for hand-off. Jpn. Pat. Appln. KOKAI Publication
15   No. 2002-171555, for example, discloses the following
technique (pages 2 to 5 and FIG. 1): When a mobile
communication terminal selects a peripheral base
station as a hand-off destination candidate, it stores,
in its database, information indicating the base
20   station, together with positional information
indicating the position of the terminal itself. When
the terminal again enters the cell indicated by the
positional information, it selects the information,
stored in the database, in preference to a neighbor
25   list acquired from a base station corresponding to the
cell. Based on the selected information, the terminal
searches the peripheral base stations for a hand-off

destination candidate. This search technique, however, requires a function for acquiring information indicating the position of a mobile communication terminal, which increases the circuit scale of the terminal and the amount of processing by the CPU of the terminal.

Further, Jpn. Pat. Appln. KOKAI Publication No. 2001-54156 discloses a technique for searching for a pilot signal transmitted from a peripheral base station, acquiring a neighbor list from the base station detected by searching, and selecting a hand-off destination candidate from the acquired neighbor list. In this technique, to acquire a neighbor list from a peripheral base station, a mobile communication terminal holds synchronization with the active base station, while periodically searching peripheral base stations other than the active one to select an accessible base station. After selecting the accessible base station, the terminal must perform processing for acquiring a neighbor list therefrom. This processing significantly reduces the battery life of the terminal.

BRIEF SUMMARY OF THE INVENTION

It is an object of the invention to provide a mobile communication terminal capable of efficiently selecting a base station as an appropriate hand-off destination candidate, without acquiring information

indicating the position of the terminal itself, or neighbor lists from peripheral base stations, thereby reducing the power consumption of the terminal and increasing its battery life. It is another object of the invention to provide a base-station selection method employed in this mobile communication terminal.

To attain the objects, in a mobile communication terminal according to an embodiment, a first neighbor list is acquired from the first base station serving the mobile communication terminal in a standby mode, and stored in a memory. If the serving base station is changed in a standby mode from the first base station to a second base station, a second neighbor list is acquired from the second base station. When the second base station is serving the mobile communication terminal in a standby mode, the communication quality between the mobile communication terminal and each of the second peripheral base stations listed in the acquired second neighbor list is measured. Further, the communication quality between the mobile communication terminal and each of the first peripheral base stations listed in the stored first neighbor list is measured. Based on the measured communication quality, a peripheral base station that satisfies a preset condition is selected as a hand-off destination candidate.

Additional objects and advantages of the invention

will be set forth in the description which follows, and
in part will be obvious from the description, or may be
leaned by practice of the invention. The objects and
advantages of the invention may be realized and

5   obtained by means of the instrumentalities and
combinations particularly pointed out hereinafter.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

The accompanying drawings, which are incorporated
in and constitute a part of the specification,

10   illustrate an embodiment of the invention, and together
with the general description given above and the
detailed description of the embodiment given below,
serve to explain the principles of the invention.

FIG. 1 is a block diagram illustrating the

15   configuration of a mobile communication terminal
according to a first embodiment of the invention;

FIG. 2 is a flowchart illustrating the procedure
and contents of base-station selecting control
performed by the mobile communication terminal of

20   FIG. 1;

FIG. 3 is a flowchart illustrating the procedure
and contents of base-station selecting control
performed by a mobile communication terminal according
to a second embodiment of the invention; and

25   FIG. 4 is a view useful in explaining problems in
prior art.

DETAILED DESCRIPTION OF THE INVENTION

(First Embodiment)

A cellular mobile communication network system
according to a first embodiment of the invention
employs a code division multiple access (CDMA) scheme.
A base station transmits a pilot signal. The pilot
signal is diffused by a predetermined diffusion code.
An initial phase offset value that varies between
base stations is assigned to a diffusion code.
When establishing initial synchronization with a base
station upon turn-on or out of synchronization,
a mobile communication terminal searches all peripheral
base stations close to the terminal, using a sliding
correlator. Further, when establishing synchronization
in preparation for hand-off, the terminal receives
pilot signals transmitted from the active base station
with which synchronization is now established, and
from other peripheral base stations, and measures the
reception quality of the signals.

FIG. 1 is a circuit block diagram illustrating
the configuration of a mobile communication terminal
according to the first embodiment. This terminal
comprises a radio unit U1, input/output unit U2,
control unit U3 and power unit U4.

The radio unit U1 has an antenna 1, antenna
duplexer 2, reception circuit 3, transmission circuit 4
and modulation/demodulation circuit 5. The reception

circuit 3 amplifies the low noise component of a radio
signal received by the antenna 1, and down-converts it
into an intermediate frequency signal or baseband
frequency signal.

5   The modulation/demodulation circuit 5 converts a
received signal into a digital signal, and inputs it to
a RAKE receiver and search receiver. The RAKE receiver
has a plurality of finger circuits and a symbol
synthesizer. Each finger circuit subjects the input
10   signal to despreading, thereby reproducing a received
signal of a desired path. The symbol synthesizer
adjusts the phases of signals output from the finger
circuits, and subjects the signal to symbol synthesis.
The resultant signal is decoded.

15   The search receiver has a sliding correlator.
Using the sliding correlator, a diffusion code for
a pilot signal transmitted from a base station is
detected by searching, thereby detecting its offset
value. The detection result is input to the control
20   unit 10.

The modulation/demodulation circuit 5 subjects
transmission data to orthogonal modulation and
diffusion using a diffusion code, then converts the
resultant signal into an analog signal, and outputs
25   the analog signal to the transmission circuit 4. The
transmission circuit 4 up-converts the input analog
transmission signal into a radio frequency signal,

and amplifies it. The amplified signal is output to
the antenna 1 via the antenna duplexer 2, and is
transmitted therefrom to a base station.

The input/output unit U2 comprises a speech
decoder 6, speech coder 7, speaker 8, microphone 9,
display 11 and input device 12. The display 11 is
formed of an LCD, and the input device 12 is formed of
a dial keypad.

The speech decoder 6 has a digital/analog
converter and driver. The decoder 6 converts, into
an analog signal, reception data demodulated by the
modulation/demodulation circuit 5, thereby amplifying
it and output it as voice through the speaker 8.
The speech coder 7 has a speech amplifier and analog/
digital converter. The coder 7 amplifies the speech
signal output from the microphone 9, thereby converting
it into transmission data as a digital signal, and
supplying it to the modulation/demodulation circuit 5.

The control unit U3 comprises a central processing
unit (CPU) 10 and memory 20. The memory 20 is formed
of, for example, a flash memory or RAM. The memory 20
has first and second memory areas 21 and 22 for storing
neighbor lists. Specifically, the first memory area 21
stores a neighbor list NLa acquired from the active
base station with which synchronization is now
established. The second memory area 22 stores neighbor
lists NLb and NLc acquired from two base stations

with which synchronization was established before.
The neighbor lists NLb and NLc acquired from the past
two base stations are called expanded neighbor lists.

The CPU 10 has a neighbor-list storage control
function, base-station selection control function and
hand-off control function as control functions for
realizing the first embodiment.

The neighbor-list storage control function
acquires a neighbor list NLa from the active base
station with which synchronization is now established,
each time initial synchronization is established or
active-base-station change occurs as a result of hand-
off. The thus-acquired neighbor list NLa is stored in
the first memory area 21. Before storing the newest
neighbor list NLa, the neighbor lists NLa and NLb
stored in the first and second memory areas 21 and 22
are all stored in the second memory area 22 as expanded
neighbor lists NLb and NLc.

The base-station selection control function reads
the neighbor list LNa and expanded neighbor lists NLb
and NLc from the first and second memory areas 21
and 22, and measures the reception quality of the
peripheral base stations listed in the neighbor lists
NLa, NLb and NLc. The measurement of reception quality
is performed by detecting the SIRs of signals
transmitted from the respective peripheral base
stations. The measured reception quality levels are

compared with a preset threshold value. If a certain
reception quality level is higher than the threshold
value, the peripheral base station corresponding to
the reception quality level is selected and stored as

5   a hand-off destination candidate. If there are several
reception quality levels higher than the threshold
values, the peripheral base station corresponding to
the highest reception quality level is selected as the
hand-off destination candidate. In this case, the

10   peripheral base stations corresponding to reception
quality levels lower than the highest level and higher
than the threshold value are stored as substitutes.

The hand-off control function periodically
measures the reception quality of the active base

15   station with which synchronization is now established,
and compares the measured reception quality with
a preset maintenance reference value. If it is
determined as a result of comparison that the measured
reception quality becomes less than the maintenance

20   reference value, the reception quality of a peripheral
base station stored as a hand-off destination candidate
is measured and compared with the maintenance reference
value and a preset hand-off reference value. If the
former is not less than the hand-off reference value or

25   maintenance reference value, the mobile communication
terminal and active base station cooperate to perform
processing for the terminal to hand off from the active

base station to the hand-off destination candidate.
On the other hand, if the measured reception quality is
less than the hand-off reference value or maintenance
reference value, an unspecified number of base stations

5   existing in all cells are searched, and synchronization
is established with a base station of the best
reception quality detected by this searching.

The power unit U4 comprises a power supply circuit
13 and battery 14. From the output of the battery 14,

10   the power supply circuit 13 generates a DC voltage
needed for operating the units U1, U2 and U3.

The operation of the mobile communication terminal
constructed as above that is related to hand-off will
now be described. FIG. 2 is a flowchart illustrating

15   the control procedure and control contents of the
CPU 10.

The first memory area 21 already stores a neighbor
list NLa acquired from the active base station with
which synchronization is now established, and the

20   second memory area 22 already stores neighbor lists NLb
and NLc acquired from two base stations with which
synchronization was established before.

In this state, the CPU 10 measures the reception
quality levels of all to-be-measured base stations at

25   a step 2a. Firstly, the CPU 10 causes the radio unit
U1 to receive a pilot signal transmitted from the
active base station with which synchronization is now

established, and measures the SIR of the received
signal. Subsequently, the CPU 10 reads the neighbor
list NLa from the first area 21 of the memory 20,
thereby causing the radio unit U1 to receive a pilot
5   signal transmitted from each peripheral base station
listed in the read neighbor list NLa, and measuring the
SIR of the signal. Furthermore, the CPU 10 reads the
expanded neighbor lists NLb and NLc from the second
area 22 of the memory 20, thereby causing the radio
10   unit U1 to receive a pilot signal transmitted from each
peripheral base station listed in the read neighbor
lists NLb and NLc, and measuring the SIR of the signal.

Thereafter, the CPU 10 selects a peripheral base
station as a hand-off destination candidate at a step
15   2b. Specifically, the CPU compares the SIR measured at
the step 2a with a preset threshold value, and selects
a peripheral base station of the best reception quality
from the peripheral base stations having reception
quality levels not less than the threshold value,
20   thereby storing the selected base station as a hand-off
destination candidate.

When determining whether hand-off processing
should be performed, the CPU 10 causes, at a step 2c,
the radio unit U1 to receive a pilot signal transmitted
25   from the active base station with which synchronization
is now established, measures the SIR of the received
signal, and compares the measured SIR with a preset

maintenance reference value. If it is determined as a

result of comparison that the measured SIR is not less

than the maintenance reference value, the processing

is returned to the standby processing. If, on the

5   other hand, the measured SIR becomes less than the

maintenance reference value, the CPU 10 measures, at a

step 2d, the SIR of a pilot signal from the peripheral

base station stored as the hand-off destination

candidate, and compares the measured SIR with the

10   preset hand-off reference value. If the measured SIR

is not less than the hand-off reference value, the CPU

10 proceeds to a step 2j where it performs hand-off

processing. Hand-off processing is executed when

the CPU issues a hand-off request to the active base

15   station with which synchronization is now established,

and receives an instruction to perform hand-off

processing, issued from the active base station in

response to the hand-off request. The hand-off

request contains identification information indicating

20   a peripheral base station as a hand-off destination

candidate.

If, on the other hand, the SIR of a pilot signal

from the peripheral base station as the hand-off

destination candidate is less than the hand-off

25   reference value, the CPU 10 proceeds to a step 2e where

the measured SIR is compared with the maintenance

reference value. If the measured SIR is not less than

the maintenance reference value, the CPU 10 proceeds to the step 2j, thereby performing the above-mentioned hand-off processing.

If the measured SIR is less than the maintenance reference value, the CPU 10 proceeds to a step 2f, thereby searching an unspecified number of base stations existing in all cells, and selecting the base station of the highest SIR. At a step 2g, the CPU 10 establishes synchronization with the selected base station.

After establishing synchronization with the new base station, the CPU 10 proceeds to a step 2h where it acquires a neighbor list NLa from the new active base station. At a step 2i, the CPU 10 updates the neighbor list NLa stored in the first memory area 21, and the expanded neighbor lists NLb and NLc stored in the second memory area 22.

The acquisition of a neighbor list NLa from a new active base station (step 2h), and the update of the neighbor lists NLa, NLb and NLc in the memory 20 (step 2i) are also performed after the execution of the hand-off processing (step 2j).

As described above, in the first embodiment, each time the present active base station as a synchronization destination is changed to a new one, a neighbor list NLa is acquired from the present active base station and stored in the first memory area 21 of the

memory 20. At the same time, two, at maximum, of the neighbor lists, stored so far in the first and second memory areas 21 and 22, are then stored in the second memory area 22. When a peripheral base station as a hand-off destination candidate is selected, the neighbor list NLa and expanded neighbor lists NLb and NLc are read from the first and second memory areas 21 and 22, and the reception quality levels (SIRs) of the peripheral base stations listed in these lists are measured. Based on the measurement results, the peripheral base stations having SIRs higher than the threshold value are selected as hand-off destination candidates.

Thus, the selection targets as hand-off destination candidates are not limited to the peripheral base stations listed in the neighbor list NLa acquired from the present active base station, but are expanded to those listed in the neighbor lists NLb and NLc acquired from the past two active base stations. Accordingly, the probability of selecting an appropriate peripheral base station is increased. This being so, even in a place, such as a city or mountain place, in which the transmission line environment easily varies, the degree of necessity of searching all cells is lowered, which suppresses the power consumption of mobile communication terminals and increases the lives of batteries.

Further, to expand the selection target range of hand-off destination candidates, it is not necessary to acquire position information concerning the mobile communication terminal, or to acquire a neighbor list

5   from a peripheral base station other than the active base station.   Therefore, the power used for these purposes can be saved.

(Second Embodiment)

In a second embodiment of the invention, when

10   selecting a peripheral base station as a hand-off destination candidate, firstly, the peripheral base stations listed in the neighbor list NLa stored in the first memory area 21 are subjected to reception quality measurement.   If no appropriate hand-off destination

15   candidate is detected from the measurement results, the reception quality levels of the peripheral base stations listed in the expanded neighbor lists NLb and NLc are measured to select a hand-off destination candidate.

20   FIG. 3 is a flowchart illustrating the procedure and contents of base-station selecting control performed by a mobile communication terminal according to the second embodiment of the invention.   Since the mobile communication terminal of the second embodiment

25   has the same configuration as that shown in FIG. 1, the configuration of the second embodiment will be described with reference to FIG. 1.

The first memory areas 21 already stores a
neighbor list NLa acquired from the active base station
with which synchronization is now established, and the
second memory area 22 already stores neighbor lists NLb
5   and NLc acquired from two base stations with which
synchronization was established before.

In this state, the CPU 10 causes the radio unit
U1 to receive a pilot signal transmitted from the
active base station with which synchronization is now
10   established, and measures the SIR of the received
signal (step 3a). Subsequently, the CPU 10 reads the
neighbor list NLa from the first area 21 of the memory
20, thereby causing the radio unit U1 to receive
a pilot signal transmitted from each peripheral base
15   station listed in the read neighbor list NLa, and
measuring the SIR of the signal.

At a step 3b, the CPU 10 compares the measured SIR
with a preset threshold value, selects a peripheral
base station of the best reception quality from the
20   peripheral base stations having SIRs higher than
the threshold value, and stores it as a hand-off
destination candidate.

When determining whether hand-off processing
should be performed, the CPU 10 causes, at a step 3c,
25   the radio unit U1 to receive a pilot signal transmitted
from the active base station with which synchronization
is now established, measures the SIR of the received

signal, and compares the measured SIR with a preset
maintenance reference value. If it is determined as a
result of comparison that the measured SIR is not less
than the maintenance reference value, the processing

5   is returned to the standby processing. If, on the
other hand, the measured SIR becomes less than the
maintenance reference value, the CPU 10 measures, at a
step 3d, the SIR of the peripheral base station stored
as the hand-off destination candidate, and compares the

10   measured SIR with a preset hand-off reference value.
If the measured SIR is not less than the hand-off
reference value, the CPU 10 proceeds to a step 3n where
it performs hand-off processing.

        If, on the other hand, the SIR of the peripheral

15   base station as the hand-off destination candidate is
less than the hand-off reference value, the CPU 10
proceeds to a step 3e where the measured SIR is
compared with the maintenance reference value. If the
measured SIR is not less than the maintenance reference

20   value, the CPU 10 proceeds to the step 3n, thereby
performing hand-off processing.

        If the measured SIR is less than the maintenance
reference value, the CPU 10 proceeds to a step 3f,
where it reads the expanded neighbor lists NLb and NLc

25   from the second memory area 22 of the memory 20,
thereby causing the radio unit U1 to receive pilot
signals from the peripheral base stations listed in

the read neighbor lists, and measuring the SIR of each received signal.

Subsequently, the CPU 10 compares the measured SIR with a preset threshold value, thereby selecting a peripheral base station of the best reception quality from the peripheral base stations having reception quality levels higher than the threshold value, and storing it as a hand-off destination candidate (step 3g).

Thereafter, the CPU 10 proceeds to a step 3h, where it compares, with a maintenance reference value, the measured SIR of the peripheral base station selected as a hand-off destination candidate from the expanded neighbor lists NLb and NLc. If it is determined as a result of comparison that the measured SIR is not less than the maintenance reference value, the CPU 10 proceeds to the step 3n, thereby executing hand-off processing.

On the other hand, if the measured SIR is less than the maintenance reference value, the CPU 10 proceeds to a step 3i, thereby searching an unspecified number of base stations existing in all cells. From the search results, the CPU 10 selects a base station corresponding to the highest SIR. At the nest step 3j, the CPU 10 establishes synchronization with the selected base station.

Upon establishing synchronization with the new

base station, the CPU 10 acquires a neighbor list NLa
from the new active base station at a step 3k. At the
next step 3m, the CPU 10 updates the neighbor list NLa
stored in the first memory area 21 of the memory 20,
and the expanded neighbor lists NLb and NLc stored in
the second memory area 22.

The acquisition of a neighbor list NLa from a new
active base station (step 3k), and the update of the
neighbor lists NLa, NLb and NLc in the memory 20
(step 3m) are also performed after the execution of
the hand-off processing (step 3n).

As described above, in the second embodiment,
when selecting a peripheral base station as a hand-off
destination candidate, firstly, the reception quality
of each peripheral base station listed in the neighbor
list NLa stored in the first memory area 21 is
measured. If a peripheral base station that satisfies
the condition is not found, the reception quality of
each peripheral base station listed in the expanded
neighbor lists NLb and NLc stored in the second memory
area 22 is measured to select the hand-off destination
candidate.

As described above, only when an appropriate one
as a hand-off destination candidate is not found in the
peripheral base stations listed in the neighbor list
NLa acquired from the active base station with which
synchronization is now established, the peripheral base

stations listed in the expanded neighbor lists NLb and NLc are searched. Therefore, the power required for searching peripheral base stations can be reduced and hence the battery life can be further lengthened,

5   compared to the case where all peripheral base stations listed in the neighbor list NLa and expanded neighbor lists NLb and NLc are simultaneously searched. This also leads to the shortening of the time required to select a peripheral base station as a hand-off

10   destination candidate (i.e., the required hand-off processing time).

(Other Embodiments)

In the above-described embodiments, all peripheral base stations listed in the neighbor list NLa and

15   expanded neighbor lists NLb and NLc are searched unconditionally. However, the peripheral base stations listed in the neighbor list NLa may overlap those listed in the expanded neighbor lists NLb and NLc. Further, the peripheral base stations listed in the

20   expanded neighbor list NLb may overlap those listed in the expanded neighbor list NLc. In light of this, when searching the peripheral base stations listed in the expanded neighbor lists NLb and NLc, the overlapping ones are excluded so that only the different ones are

25   searched.

This prevents the same peripheral base station from being searched doubly, thereby enabling an

appropriate peripheral base station as a hand-off
destination candidate to be selected by a smaller
number of searching operations and hence in a shorter
time (the required hand-off processing time can be
5   reduced). In other words, the power required for
searching peripheral base stations can be further
reduced, and the battery life can be further
lengthened.

Further, priority levels may be set for the
10   peripheral base stations listed in the expanded
neighbor lists. In this case, the peripheral base
stations are searched in the order of priority. Each
time one peripheral base station is searched, the SIR
of the station may be compared with a threshold value,
15   and if the SIR is not less than the threshold value,
this peripheral base station may be instantly selected
as a hand-off destination candidate. The priority
level can be set based on, for example, the frequency
of searching operations, reception quality, the number
20   of occasions in which the peripheral base station has
been selected as a hand-off destination candidate, and
the number of occasions in which the peripheral base
station has been selected as a hand-off destination.

Furthermore, a plurality of search lists of
25   different priority levels may be prepared. In this
case, a searching operation is performed, beginning
from the peripheral base stations listed in a search

list of the highest priority level, thereby selecting
one peripheral base station as a hand-off destination
candidate.

This can reduce the number of searching operations
performed to select a peripheral base station as
a hand-off destination candidate, thereby further
reducing the required hand-off processing time and
power consumption, and lengthening the battery life.

In the above-described embodiments, a neighbor
list NLa acquired from an active base station is stored
as an expanded neighbor list until two more neighbor
lists NLa are newly acquired. However, the neighbor
list NLa may be stored until a number n (n $\geqq$ 3) of
more neighbor lists are newly acquired. Yet further,
the expanded neighbor lists may be stored for a preset
time, and erased after the present time elapses.
This enables the memory to store only relatively new
neighbor lists.

In addition, in the above embodiments, the SIR of
a pilot signal is measured. However, the quality of
communication may be measured from a power control
signal contained in data transmitted from a base
station via a traffic channel, or from the received
electric field intensity (RSSI).

The present invention is also applicable to
a mobile communication terminal that employs
a communication scheme, other than CDMA in which

initial synchronization is established using a sliding correlator.

The circuit configuration of the mobile communication terminal of the invention, and the procedure and contents of neighbor list acquisition control, base-station selection control and hand-off control employed in the invention may be modified in various ways without departing from the scope of the invention.

Additional advantages and modifications will readily occur to those skilled in the art. Therefore, the invention in its broader aspects is not limited to the specific details and representative embodiments shown and described herein. Accordingly, various modifications may be made without departing from the spirit or scope of the general inventive concept as defined by the appended claims and their equivalents.